

Appl. No. 09/639,636  
Amdt. Dated 29 July 2003  
Reply to Office action of 6 May 2003

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Appl. No. : 09/639,636  
Applicant : Guida et al.  
Filed : 15 August 2000  
Title : High Resolution Anti-Scatter X-ray Grid and Laser Fabrication Method  
TC/A.U. : 1722  
Examiner : Luk, Emmanuel S.  
  
Docket No. : RD25905-6  
Customer No. : 6147

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#### RESPONSE UNDER 37 CFR 1.111

This case has been carefully reviewed in light of the Office Action dated 6 May 2003, wherein claims 10-11 and 15-17 were rejected under 35 USC 103(a) on Lambda Physik Industrial Report; claim 12 was rejected under 35 USC 103(a) on Lambda Physik Industrial Report in view of Konishi, US Patent No. 6,034,825; and claims 18-21 were rejected under 35 USC 103(a) on Lambda Physik Industrial Report in view of Guida et al., US Patent No. 5,557,650.

Claims 10-12 and 15-21 remain pending in this application. Reconsideration in light of the following remarks is respectfully requested.

Applicants respectfully traverse the rejection of claims 10-11 and 15-17 under 35 USC 103(a) over Lambda Physik Industrial Report. Applicants respectfully submit that Lambda does not teach or disclose the claim 10 recitations of (with emphasis added):

Claim 10 (previously presented). A system for patterning a substantially transparent polymer substrate of an anti-scatter x-ray grid, the system comprising:  
a high power laser for providing laser light;  
a beam homogenizer for conditioning the laser light; and  
a phase mask for creating a pattern of the conditioned laser light while reducing an amount of the conditioned laser light which is lost to the phase mask;  
**the laser, the beam homogenizer, and the phase mask being positioned for ablating openings having slopes less than or equal to 0.25 degrees and extending completely through an anti-scatter x-ray grid substrate having a thickness ranging from 0.3 millimeters to 1.5 millimeters.**

In response to Applicants' earlier statements regarding slope and thickness, the most recent Office action statement was as follows:

[T]he claims argue of an angle of less or equal to 0.25 degrees. This wall range includes 0 degrees or no slope to the wall and thus the wall ranges taught by Lambda would be unnecessary, since the laser placed in a perpendicular angle to the substrate would form the necessary opening with no slope. In regards to the thickness, the energy provided for the 50 micrometer thick substrate is set at a range of 30-50 in/cm<sup>2</sup>, and later in the same column on page 8, as pointed out by the applicant, Lambda discusses the use of 800 mJ/cm<sup>2</sup> for the laser. In correlation to the energy expenditure of the laser, this would enable for use in a substrate thickness of 800 micrometers, including the range of the expressed by the claims of 300 to 1500 micrometers.

Neither of the Lambda reference examples relate to x-ray grid substrates. One example relates to via formation (pages 1-6), and the other relates to ink jet nozzles (pages 6-8).

Pages 1-6 of the Lambda reference describes conventional via formation for electronic packaging applications with wall angle ranges described as 50-65 degrees for 1987 and 20-75 degrees for 1994 (page 3, table 2) and shows wall angles in FIGs. 10 and 11 that are necessary for metal coverage (bottom left of page 5). As can be seen from FIG. 5, designation of angle "S", and page 7, lines 5-13, of the Specification, Applicants were measuring the 0.25 degrees off an axis orthogonal to substrate 114. A "slope" of 0 to .25 degrees as defined by Applicants would correspond to an angle of 89.75 to 90 degrees with respect to the plane of the substrate. Applicants cannot determine which axis the Lambda range refers to. However, in 20-75 does not fall within either 0-0.25 or 89.75-90.

Pages 6-8 of the Lambda reference relate to ink jet nozzles and indicate that a 90 mm long axis by 3 mm short axis with a steep slope is desirable. It is simple to state that steep slopes are desirable. However, these slopes are difficult to obtain.

In Applicants' invention, the high power laser, the phase mask and the conditioning work together to maximize the amount of laser light that reaches the substrate and minimize the wasted light as well as the opportunity for successful x-ray grid substrate fabrication. Applicants' combination of the elements of claim 10 provides a commercially feasible system for ablating the x-ray grid substrate with the desired slopes by maximizing the utilization of available power.

Accordingly, Applicants respectfully submit that the claimed invention defines allowable subject matter over the applied art. Withdrawal of the rejection of claim 10, and claims 11 and 15-17 which depend therefrom, is respectfully requested.

Claim 12 was rejected under 35 USC 103(a) on Lambda Physik Industrial Report in view of Konishi. Claim 12 depends from claim 10 which Applicants believe to be in condition for allowance over Lambda for the reasons discussed above regardless of whether Konishi might be interpreted to teach or suggest an axial gradient-index lens. Accordingly, Applicants respectfully submit that claim 12 defines allowable subject matter over Lambda and Konishi.

Applicants respectfully traverse the rejection of claims 18-21 under 35 USC 103(a) over Lambda Physik Industrial Report in view of Guida et al., US Patent No. 5,557,650. Applicants respectfully submit that Lambda does not teach or disclose the claim 18 recitations of (with emphasis added):

18 (previously presented). A system for fabricating an anti-scatter x-ray grid for medical diagnostic radiography, the system comprising:  
a sub-system for providing a high laser beam fluence with low beam divergence, the sub-system including (a) a phase mask between a substantially transparent substrate and a high power laser and (b) a beam homogenizer for conditioning the laser beam to optimize utilization of beam energy delivered by the laser;  
means for **ablating portions** of the substrate through the phase mask with the conditioned laser beam;  
means for **filling the ablated portions** of the substrate with a substantially absorbent material;  
and  
means for **removing additional portions of the substrate while permitting selected portions of the substrate to remain.**

As stated in the Office Action, Lambda does not relate to filling ablated portions and removing additional portions while permitting selected portions to remain. Applicants traverse, however, the Office Action characterization of Guida's substrate polishing "to remove stray **metal**" as being "removing additional portions of the **substrate**" in the sense described in claim 18. What is claimed in claim 18, described on page 6, lines 1-5, and shown in FIG. 4 is removal of pieces 115 of the substrate itself and not merely stray metal situated therein. Thus, even if the two references were to be combined, the result would still not teach or suggest the claim 18 recitations.

Accordingly, Applicants respectfully submit that the claimed invention defines allowable subject matter over the applied art. Withdrawal of the rejection of claim 18 and claims 19-21 which depend therefrom is respectfully requested.

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact Applicants' undersigned representative at the telephone number below.

Respectfully submitted,

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Attachment: IDS with EPO cited art and search report.